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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/545,685	04/07/2000	Norman Krause	00113	2090

7590 07/16/2002

THE PATENT GROUP
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EXAMINER

LIN, JEYUHU

ART UNIT PAPER NUMBER

3737

DATE MAILED: 07/16/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/545,685	KRAUSE ET AL.	
	Examiner	Art Unit	
	Jeoyuh Lin	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 31-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 31-40 is/are rejected.
- 7) ☒ Claim(s) 7-10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Entry of Amendment

1. Applicant's amendment, filed on February 21, 2002, as paper No. 8, is acknowledged. Claims 1-10 and 31-40 are currently pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

-Claims 1-6, 31, 32, and 34-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gueziec et al. (US 5,951,475).

Gueziec teaches a method of registering a 3D model onto multiple fluoroscopic images, comprising the following features:

- Extracting bone contour from 2D X-ray images. (Column 5, line 58 and column 8, lines 10-15)
- Creating a 3D- bone model. (Column 8, line 5-10)
- Determine 3-D silhouette curves on the model that fit the contour of the 2D-image contour, and vice versa. (Column 8, line 20-25)
- Performing and repeating a matching process, which includes adjusting the size and position of the model (through coordinate matching and rotation matrix (Columns 15 and 16) until the two data converge, so that their differences are minimized. (Column 8, lines 25-28 and column 26, lines 1-15 and lines 53-65)

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- Creating a surgical plan from the model. (Column 7, lines 15-37 and column 24, lines 31-37)

- Accepting X-ray images in digital format. (Column 15, lines 1-5)

- Accepting a position of a camera. (Column 24, lines 18-38)

Guesiec fails to specifically mention adjusting a size and position of the template bone model. It further fails to teach deforming a 3D model. However, Guesiec does teach the transformation, the translation, and the rotation of the model to fit the image (Column 16, lines 40-54), and further including minimizing the distance between the image coordinate that matches corresponding model coordinate. (Column 17, lines 1-38). Since minimizing the distance necessitates changing the size and shape of the model, it is obvious to one having ordinary skill in the art that the transformation method as taught by Guesiec involves deformation, or the change of shape, to the model in order to fit the image.

- Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gueziec et al., as applied to claim 31 above, and further in view of Delorme et al. (XP10358815).

Gueziec et al. meets all the claims except that it fails to teach minimizing differences based on free form deformation parameters. Delorme teaches a Three-dimensional Modelling and rendering method, comprising the free-form deformation step to deform a bone model in order to fit it to an image. (Section 2.3) It would have been obvious to one having ordinary skill in the art at the time the invention was made

to adapt the teachings of Delorme to that of Gueziec to evaluate the accuracy of the methods performed.

Allowable Subject Matter

3. Claims 7-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

-Moshfeghi (US 5,633,951) teaches a 3-D image registration method, comprising 2 3-D volume deformation.

-Adler et al. (US 6,028,907) teaches a method of 3-D geometric model creation, comprising the step of merging 2 2-D contours.

-Cyr et al. teaches a method of 2-D-3-D registration based on shape matching and projection of 3-D image to plane. However, it fails to teach a model-deforming step.

-Jacq et al. teaches a method for comparing 3-D images with 3-D models. However, it fails to teach 2-D image forming with a 3-D model.

-Tonet et al. teaches a navigation system, comprising the segmentation of 2-D images onto 3-D images.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeoyuh Lin whose telephone number is (703) 306-5990. The examiner can normally be reached on m-f, 8:30-6:00.

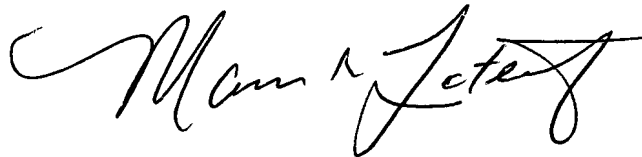
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marvin Lateef can be reached on (703) 308-3256. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-0758 for regular communications and (703) 308-0758 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0858.

JYL

JYL
July 12, 2002

A handwritten signature in black ink, appearing to read "Marvin M. Lateef". The signature is fluid and cursive, with the first name "Marvin" and last name "Lateef" clearly distinguishable.

Marvin M. Lateef
Supervisory Patent Examiner
Group 3700